

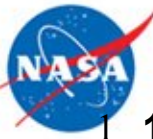
ECHO

Enabling Interoperability with NASA Earth Science Data and Services



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Univ. of New Hampshire
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Agenda

- **NASA Data and Services**
- **Challenges**
- **ECHO introduction**
- **Supporting Interoperability at three levels**
- **Leveraging ECHO**
- **A Generic Client**



NASA's ESDIS – Serving the EO Community

■ Providing access to EO data and Services

■ Evolving user community

■ Resources

- Data resources
 - Petabytes of data
 - Multiple locations
- Service resources
 - Providing functions to manage and optimize of that data and computing resources
 - Publishing, Discovery, Assessment, Transformation, Access, Models, Decision Support Systems



Challenges

■ Volume of Data

■ Diversity

- Data
 - Types, formats, usage
 - Location, Access Methods, Security (Visibility and Access)
- User Community
 - Science, Education, Decision Makers

■ Optimizing Resource usage

■ Finding what matters

- What data is applicable?
- What part of that data?
- What can I do with that data?



ECHO's role in the enterprise

■ ECHO as Middleware

- Services with programmatic interfaces
- Metadata and Service Registries

■ Provides an SOA platform

- Publish, Find, Understand, Access (online and ordering)
- Security, Governance

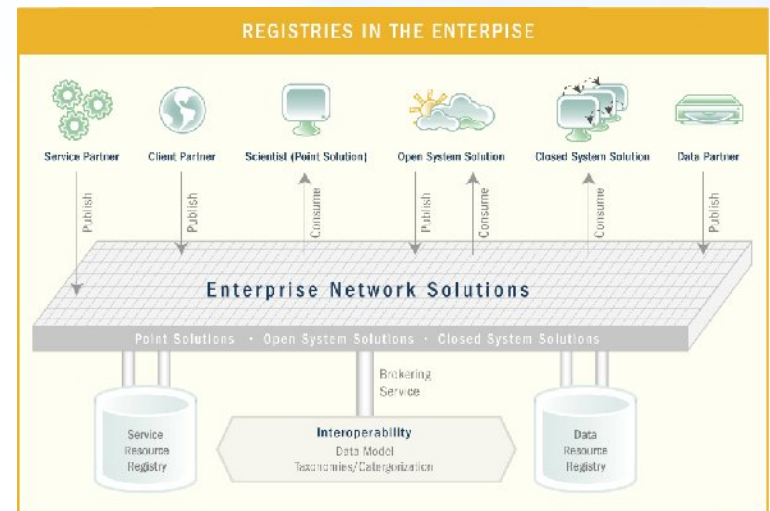
■ Supporting Providers and Consumers

■ Multiple Providers

- Legacy Systems
- Multiple provider types
 - Data, Service, Client

■ Enabling

- More efficient data usage
- Innovation of client application
- Partner organizations to focus on their mission





The need for interoperability

- **Scientist wants to investigate how rainfall affects sea surface temperature and validate his model for sea surface temperature with remote observations.**
- **The scenario – “Before”**





Data Interoperability within ECHO

■ Context of Discovery

- Data set level
- Inventory Level

■ Common Data Model

- Based on NASA's ECS data model
- Mapped to ISO 19115

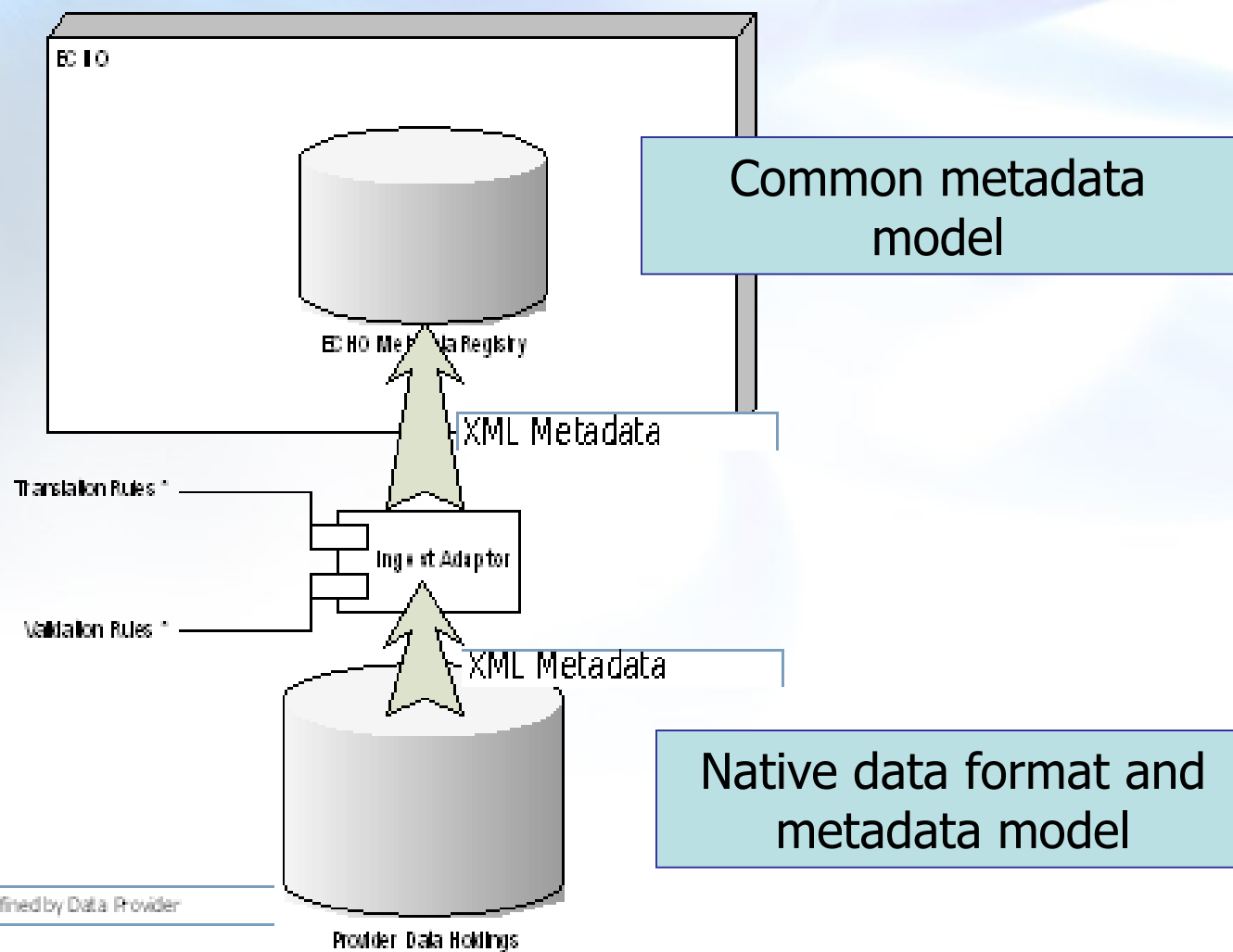
■ One metadata language for query, results from different sources of differing types, formats and intended usage

■ Architected for Extensibility

- Adapters and translators
- Additional Services



Publishing Data to ECHO





Service Interoperability

■ Standards-based Services Registry

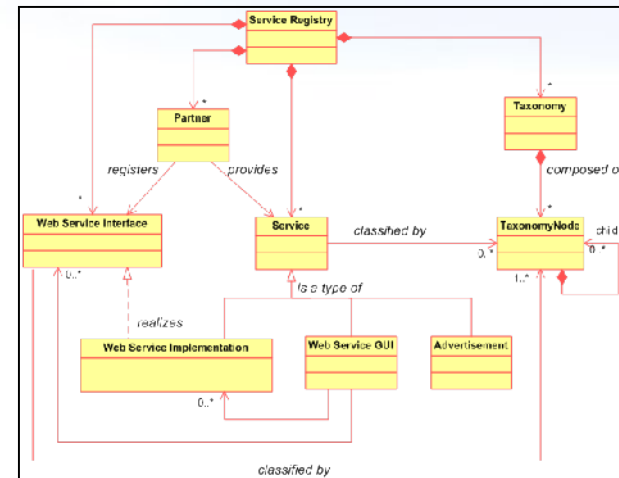
- UDDI, WSDL

■ Multiple service types

■ Taxonomies for Service Categorization

- Data Set
- Data Format
- Service Type (ISO 19119)
- Others in discussion

■ Enabling Orchestration





Interoperability between Data and Services

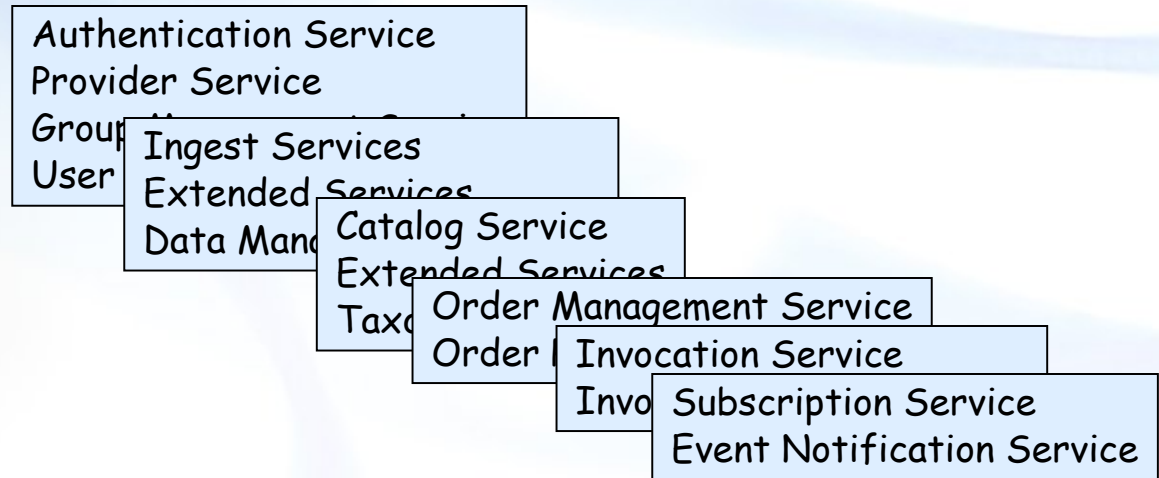
- **Integrating data from one source with services from another source**
 - Neither was necessarily intended to work specifically with each other
- **The “right-mouse click”**
 - “What can I do with this?”
- **Supported through Data and Service categorizations**
- **Software interface for discovering relevant services**



Leveraging ECHO

■ Services for

- Participation
- Publication
- Discovery
- Ordering
- Brokering
- Eventing



■ ECHO Services

- Web Services
 - WSDL available:
 - <http://api.echo.nasa.gov/echo-wsdl/v10/<SvcName>.wsdl>

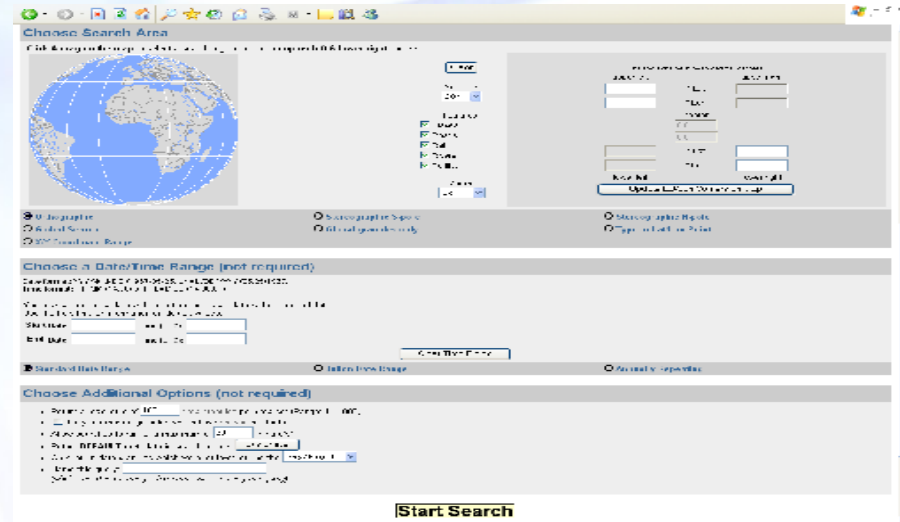
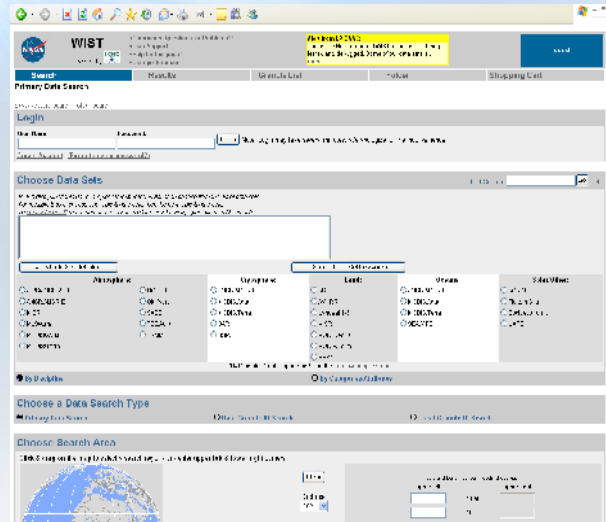
■ Documentation

- <http://www.echo.nasa.gov/reference/index.shtml>
- <http://www.echo.nasa.gov/reference/reference.shtml>





Warehouse Inventory Search Tool (WIST)



Warehouse Inventory Search Tool (WIST)

Users are able to submit cross-discipline queries using spatial and temporal criteria, examine search results for relevancy using built-in tools, and submit orders via ECHO to the appropriate data provider(s).

Community served: Provides search and order capabilities across the full set of data provider holdings in the ECHO catalogue.

Contact info

- Reference to client:
 - <http://wist.echo.nasa.gov>
- Submit questions or comments to the WIST Support Team at:
 - Wist_Support@echo.nasa.gov



Summary

■ ECHO provides an SOA platform that enables

- Resource Sharing
- Innovation
- Interoperability

■ Supporting Three Levels of interoperability

- Data
- Service
- Data-Service